Development of Google Sites-Based E-Modules with Team Based Project (TBP) Model Thematic Learning Course PGSD FIP UNIMED

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Abstract. Based on the conditions in the Thematic Learning Course at PGSD FIP UNIMED, the following issues were identified: 1) the New Normal period requires student learning independence, 2) there is no Team-Based Project E-module aligned with the Merdeka Campus Learning curriculum, and 3) PGSD graduates lack sufficient IT and digital learning skills. This study aims to develop, test, and evaluate the feasibility and effectiveness of a Team-Based Project E-Module for the Thematic Learning Course. Using the 4-D Model (Define, Design, Develop, Disseminate), the study produced an interactive E-module that enhances online learning experiences for students and lecturers. Feasibility evaluations showed high validity: 86.61% for content, 82.05% for design and technology, and 92.88% for practicality. The effectiveness, measured by pre-test and post-test scores, reached 81.55%. These results indicate the E-module, based on the Google Site platform, is highly feasible, practical, and effective for use.

Keywords: Development, E-Module, Thematic Learning, Team Based Project

1 Introduction

In the digital era, education encounters numerous opportunities and challenges that demand innovation within the learning process. Information and communication technology has become an essential component of contemporary society, particularly in education. Integrating technology into learning not only broadens access to educational resources but also improves the quality of interaction between teachers and students. One effective tool that can be utilized is the Google Sites-based E-Module. This platform provides flexibility, easy access, and the ability to incorporate various interactive elements such as text, images, videos, and external links that enhance technology-driven learning [1].

E-modules, or electronic modules, are multimedia-based learning tools that integrate various forms of media such as audio, text, graphics, images, animations, and videos organized systematically to support the achievement of targeted learning outcomes. As stated by Sidiq, e-modules possess distinctive features, including the presentation of content, instructional methods, constraints, and assessment techniques, all designed in a manner that engages and attracts learners [2]. In practice, e-modules are commonly delivered through compact discs (CDs) or other digital platforms that enable interactive engagement between users and the content. According to Daryanto, an effective e-module should possess several key attributes, including the ability for self-directed learning, comprehensive content

coverage, independence from other resources, adaptability to different learning needs, and a user-friendly interface [3], [4]. This feature signifies that the e-module is intended for independent use, allowing learners to navigate and understand the content with minimal external assistance.

Google Sites is an application that enables users to build websites effortlessly and at no cost, either individually or in collaboration with others. It can serve as an effective learning tool, allowing the creation of educational websites without the need for programming skills. As noted by Suryantari et al., Google Sites is highly practical due to its compatibility with a wide range of devices including computers, laptops, and smartphones as long as there is an internet connection [5]. Waluyo and Siregar further highlight that Google Sites offers the benefits of free access and user-friendliness, making it an ideal platform for developing innovative and interactive e-modules that enhance the learning experience [6].

The Team-Based Project approach is an instructional strategy aimed at enhancing students' skills in problem-solving and decision-making through collaborative work. It allows learners to actively participate in project-based activities that are focused on addressing real-life challenges [7], [8]. Goodman and Stivers state that this approach motivates students to carry out thorough investigations, work collaboratively, and produce tangible outcomes as solutions to the problems they are presented with [9]. The learning process in this method involves several stages, including planning the project, collecting relevant data and information, forming discussion groups, carrying out the project, and finally compiling reports and presenting the outcomes [10]. According to the Ministry of Education and Culture, this approach focuses on core competencies such as critical analysis, synthesis, evaluation, and the ability to create tangible outcomes [11].

PGSD (Elementary School Teacher Education) students, as future elementary school educators teaching 21st-century learners, are expected to possess and continuously enhance their competencies [12]. Elementary school teachers in the 21st century are expected to not only excel in the four core professional competencies but also demonstrate strong technological literacy. This aligns with findings from the 2021 PGSD graduate tracer study, which revealed that many graduates still lack adequate technology skills. In the post-COVID-19 era, technological literacy is increasingly essential, particularly as students are required to navigate independent learning through digital tools [13], [14]. In this regard, having strong technological literacy is highly relevant to supporting the courses offered in the PGSD program, particularly the Thematic Learning course.

Thematic learning is a compulsory course that PGSD students are required to master. This course encourages students to deliver subject matter using a thematic approach tailored to the knowledge and character of learners at each grade level. Developing thematic learning should be done holistically, covering aspects such as instructional media, assessments, worksheets, and teaching materials. One innovative approach to support this learning method is the integration of Google Sites-based E-Modules with the Team-Based Project (TBP) learning model [15]. Through this approach, students are encouraged not only to grasp conceptual understanding but also to actively participate in collaborative activities that foster 21st-century skills, including critical thinking, communication, and teamwork.

The team project-based thematic learning approach offers students a practical and real-world learning experience. Within this model, students collaborate in groups to complete projects aligned with particular learning themes. The use of Google Sites-based E-Modules allows for seamless and integrated access to project guidelines, instructional content, and assessment outcomes. Such learning media development not only enhances students'

understanding of the course material but also equips them with the skills needed to effectively manage technology-driven instruction as future educators.

This study aims to evaluate the development and feasibility of Google Sites-based E-Modules combined with a team-based project model for the Thematic Learning course, specifically for PGSD students at FIP UNIMED. This method is expected to generate effective, interactive, and relevant learning resources that address the educational demands of the digital age. The development of Google Sites-based E-Modules through the Team-Based Project approach is seen as highly relevant for improving learning quality, particularly in light of the absence of thematic teaching materials in digital formats, the need for student independence in post-COVID-19 learning, and the challenges PGSD students face in mastering digital technology and hands-on learning. Previous studies have supported the effectiveness of this approach in improving communication, collaboration, and overall learning development [16], [17]. Thus, the development of this e-module not only enhances thematic learning but also equips students to tackle the growing complexities of education in the digital age.

2 Research Method

This study adopts a development research approach, incorporating adaptations of the 4-D development model originally introduced by Thiagarajan, Semmel, and Semmel [18], [19]. Developmental research focuses on evaluating changes that take place over a specific period [20]. The study was carried out in the Elementary School Teacher Education (PGSD) Program under the Faculty of Education at the State University of Medan (UNIMED) during the even semester of the 2022/2023 academic year. The research site is located on Williem Iskandar Street, Pasar V, Medan Estate, North Sumatra.

The participants in this study were 35 students from the PGSD Program, Faculty of Education, UNIMED, who were enrolled in the Thematic Learning course. The study employed the 4-D development model, which includes four phases: Define, Design, Develop, and Disseminate [21]. Each phase is structured to produce a thematic-based Interactive E-Module that is both relevant and effective for the learning process

The initial phase is the Define stage, which focuses on identifying and determining learning needs. This stage comprises five key steps: (1) conducting a front-end analysis to explore existing problems and needs; (2) analyzing learner characteristics; (3) performing a task analysis; (4) reviewing relevant concepts; and (5) formulating instructional objectives. These steps serve as the groundwork for developing a module that aligns with students' needs in thematic learning contexts.

The second phase, Design, aims to plan the instructional components to be developed. It includes four core activities: (1) developing criterion-referenced tests to evaluate learning outcomes; (2) selecting appropriate media based on the material and learning goals; (3) determining the format for the interactive module by reviewing existing formats and deciding on the most suitable one; and (4) drafting the initial design of the module according to the chosen format. This stage results in the first prototype of the Interactive E-Module.

The third stage, Develop, involves producing and refining the learning product. It consists of two essential steps: (1) expert review, followed by revisions based on feedback from subject matter and media experts; and (2) developmental testing to assess the module's quality and

effectiveness. The primary goal of this phase is to finalize an Interactive E-Module that has been improved through expert input and trial implementation.

The final phase is Disseminate, which is centered on promoting and distributing the finalized module to its target users—whether individuals, groups, or institutions. Dissemination is conducted through publications in international conference proceedings and academic journals, along with the formal release of the module as an ISBN-registered textbook. According to Thiagarajan et al., this phase includes packaging, diffusion, and adoption, which are crucial to ensuring the module's broad and effective utilization [22].

Data collection methods employed in this research include interviews, observations, questionnaires, and document analysis. Primary instruments consist of interview protocols for gathering student feedback on the module development and validation questionnaires completed by media and content experts. The expert validations assess the module's feasibility, while student feedback evaluates its acceptability and usability.

The data analysis process is divided into two main categories: analysis of the module's validity and analysis of student trial results. Validity is determined based on expert evaluations and questionnaire data, while trial results assess the module's effectiveness in enhancing thematic learning. To visually represent the development process of the Interactive E-Module, a flowchart or fishbone diagram is used. Overall, this research seeks to contribute meaningfully to the advancement of thematic learning in the digital era.
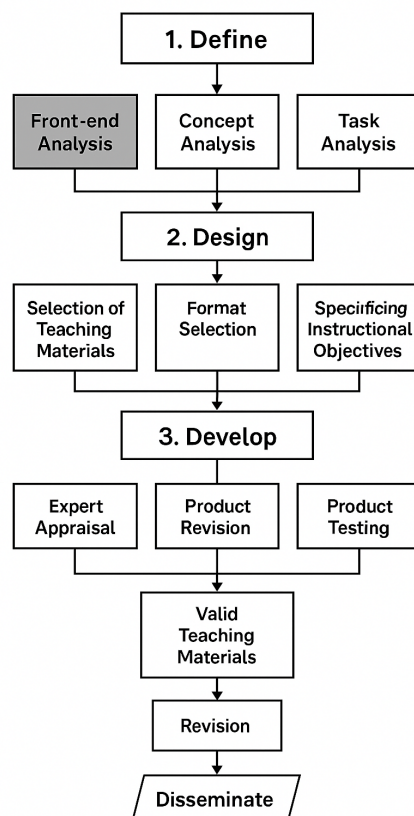

Fig. 1. Models Development Model

3 Result and Discussion

The research and development of an interactive e-module integrated with the Google Sites platform using a team-based project approach in thematic learning was carried out with Class J students from the 2021 cohort of PGSD FIP UNIMED. This study followed the systematic steps of the Research and Development (R&D) methodology. The findings of this research highlight several important outcomes related to both the process and product of the e-module development. The primary objective of this study was to introduce innovative teaching materials that enhance the efficiency and effectiveness of thematic instruction.

The final product is an interactive e-module hosted on the Google Sites platform, designed using a team-based project methodology tailored for thematic learning. The module can be accessed via the following link: https://sites.google.com/view/e-module-pembelajarantematik/home. Its development was based on the 4D (Four-D) model, comprising the stages of Define, Design, Develop, and Disseminate. This e-module includes clear steps for both creation and implementation, enabling ease of use for both students and educators, while also minimizing potential errors.

Validation of the e-module was conducted by experts in instructional design and subject content. Mrs. Imelda Free Unita Manurung, S.Pd., M.Pd., served as the instructional design and technology expert, and her evaluation resulted in a final score of 82.10%, placing the module in the "highly feasible" category. Similarly, subject matter expert Mr. Suyit Ratno, M.Pd., assigned a score of 82.05%, also indicating the "highly feasible" classification. These outcomes confirm that the module meets the necessary quality standards for effective implementation in the learning process.

Beyond its feasibility, the practicality of the e-module was also assessed in a classroom context. This was done through a survey completed by course instructors, resulting in an average score of 93.88%. This result suggests that the module is highly practical and suitable for use by both lecturers and students during thematic instruction.

The e-module not only facilitates the delivery of educational content but also promotes student collaboration and engagement through its team-based project format. This approach allows learners to collaborate, exchange ideas, and complete project-based tasks together, which supports deeper comprehension of the material and the development of critical thinking skills. Designed to be user-friendly and easily navigable, the module supports both online and offline learning environments.

At the dissemination stage, the e-module was made publicly accessible to a broad audience including teachers, students, and educational practitioners, primarily through the Google Sites platform for flexible access. Plans are in place to present this work in academic forums such as seminars, international conference proceedings, and indexed journals to further extend its reach and impact.

The success of the e-module development stems from the structured research methodology employed and the active participation of experts throughout the validation and testing phases. Feedback from instructional designers, content specialists, and practitioners significantly enhanced the quality of the module. Moreover, the results from the practicality testing provided a clear indication of the module's effectiveness and positive reception by its users.

In conclusion, this research demonstrates that the interactive e-module developed via Google Sites and based on a team-based project strategy is a highly feasible and practical innovation for supporting thematic education in elementary settings. In addition to delivering

interactive content, the module encourages the development of student collaboration and is well-suited to modern, digital-era learning environments.

4 Conclusion

This study aims to develop an E-module and a thematic learning book specifically designed for students of the Faculty of Education (FIP) at PGSD UNIMED. The purpose of this development is to revise and improve upon existing textbooks in order to enhance PGSD students' comprehension of thematic learning. The research adopts the 4-D development model, which encompasses four key stages: Define, Design, Develop, and Disseminate. In addition to producing an interactive E-module, this study also introduces students and lecturers to the experience of conducting online learning through a Team-Based Project Learning approach. This method fosters a more interactive, effective, and efficient learning environment. The feasibility assessment of the content material resulted in a score of 86.61%, indicating that it is valid and suitable for use. Furthermore, the design and technological aspects of the module received a feasibility score of 82.05%, also classified as valid and suitable for implementation. Validation of the E-module and thematic learning book draft was carried out by a team of university lecturers. The results indicate that both the E-module and the learning book fall within the "good" category, confirming their appropriateness for supporting thematic instruction in teacher education programs.

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